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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/628,857	07/28/2003	Toru Kato	0275M-000776	3845

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EXAMINER

REESE, DAVID C

ART UNIT PAPER NUMBER

3677

DATE MAILED: 01/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/628,857

Applicant(s)

KATO ET AL.

Examiner

David C. Reese

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 04 January 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 16 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 14, 15, 17 and 18 is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4, 5, 7-13 and 19-23 is/are rejected.
- 7) ☐ Claim(s) 3 and 6 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

The following is in response to the amendment filed by applicant on 1/04/05.

Status of Claims

[1] Claims 1-15 and 17-23 are now pending.

Response to Arguments

[2] Applicant's arguments filed 1/01/05 have been fully considered but they are not all persuasive as some amended claims remain to read upon that of Singh, US-6,385,843. To begin, the amendment for the rejection under 35 U.S.C. 112 has been noted and accepted, as have that of the newly submitted diagrams.

The majority of the amendments to overcome the 102 rejections have been acknowledged, though some of the amendments make the claim still read upon by that of Singh. Examiner notes the amendment to Claim 1, but the claim remains too broad, as the following amendment still reads upon Singh:

"wherein the shank has an outer diameter (3 in Fig. 1 of Singh) and a substantially flat ring-shaped end surface (ends of d2 in Fig. 1) with a radial length substantially perpendicular to the shank outer diameter, and..." (The radial length of d2 in Fig. 1 **can in its most broad interpretation** be considered substantially perpendicular to the shank outer diameter, as the ends of d2 can be considered

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perpendicular to 3 in Fig. 1. The term substantially can and is considered an extremely broad term for claim language).

The same can be accounted for that of Claims 9 and 21, as the same terminology and amendments were utilized as above.

Continuing, the amendment of Claim 19 is still considered rejected based on that of Singh, as the amendment states, "the cavity defining a conical tapered section (10 in Fig. 1 of Singh) having a linear cross-section and defining an angle..." (In its most broad interpretation, having a linear cross-section does not overcome that from Singh as 10 in Fig. 1 of Singh possesses a linear cross-section defining an angle).

Claim Rejections - 35 USC § 102

[3] The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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[4] Claims 1-2, 4-5, 8-9, 13, and 19-22 rejected under 35 U.S.C. 102(e(1)) as being anticipated by Singh et al, U.S. Patent 6,385,843 B1.

As for Claim 1, Singh teaches of a self-penetrating fastening rivet comprising:

A flange with a first diameter (5 in Fig. 1) and a shank with a hollow cavity extending from the flange (12), wherein the shank is a straight cylinder (8) with outer diameter smaller than the first diameter, the shank defining a hollow cavity (8), and a conical section tapered from a shank end and converging towards the flange (10) at angle α (bottom of Fig. 1) and a straight cylinder section with an inner diameter extending from the conical section (10), wherein the shank has an outer diameter (3 in Fig. 1 of Singh) and a substantially flat ring-shaped end surface (ends of d2 in Fig. 1) with a radial length substantially perpendicular to the shank outer diameter, (The radial length of d2 in Fig. 1 **can in its most broad interpretation** be considered substantially perpendicular to the shank outer diameter, as the ends of d2 can be considered perpendicular to 3 in Fig. 1. The term substantially can and is considered an extremely broad term for claim language) and wherein the angle α of the conical section ranges between 70° and 110° (line 55 from part II of the specification, as well as that from Claim 3, and visually from the bottom of Fig. 1).

As for Claim 2, Re: Claim 1, Singh discloses a self-piercing rivet wherein the thickness of the shank at the straight cylinder section of the hollow cavity is 25 to 45% of the outer diameter of the shank $((d1-d2)/2) = 6$ in Fig. 1)

As for Claim 4, Re: Claim 3, Singh illustrates a self-piercing rivet wherein the entire length of the shank is the sum of the overall thickness of the workpieces and a die thickness of the rivet-fastening device (Fig. 1).

As for Claim 5, Re: Claim 4, Singh makes known a self-piercing rivet wherein the entire length of the hollow cavity (L-H in Fig. 1) in the shank is greater than 70% of the overall thickness of the workpieces (D in Fig. 1).

As for Claim 8, Re: Claim 5, Singh shows a self-piercing rivet wherein the radial length of the end surface of the shank is between .2mm and .6mm (representative by the separate outer ends of d2 in Fig. 1).

As for Claim 9, Singh illustrates a method of coupling a pair of workpieces comprising:

Providing a fastener having a flange with a large diameter (D in Fig. 1) and a shank with a hollow cavity extending from the flange (12 in Fig. 1), wherein the shank is a straight cylinder with outer diameter defining a hollow cavity (8), the shank defining a conical section tapered from a shank end and converging towards the flange at angle α (10 in Fig. 1) and a straight cylinder with inner diameter extending from the conical section to an end on the flange side, wherein the shank has an outer diameter (3 in Fig. 1 of Singh) and a substantially flat ring-shaped end surface (ends of d2 in Fig. 1) with a radial length substantially perpendicular to the shank outer diameter, (The radial length of d2 in Fig. 1 **can in its most broad interpretation** be considered substantially perpendicular to the shank outer diameter, as the ends of d2 can be considered perpendicular to 3 in Fig. 1. The term substantially can and is considered an extremely

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broad term for claim language) and wherein the angle α of the conical section ranges between 70° and 110° (line 55 from part II of the specification, as well as that from Claim 3, and visually from the bottom of Fig. 1); and

striking the fastener so as to deform and expand the shank outwardly in a radial direction (Fig. 4, as well as from line 45 in part I of the specification, stating, "...the resulting higher expansion force causes the radial movement of the rivet shank outward")

As for Claim 13, Re: Claim 10, Singh discloses a method wherein striking the fastener is striking the fastener so as to form an undercut) (30 in Fig. 4, as well as from line 44 in part 3 of the specification stating, "...shows the large undercut...").

As for Claim 19, Singh illustrates a self-piercing fastener for coupling a plurality of workpieces comprising:

A cylindrical shank body defining a hollow cavity (8), the cavity defining a conical tapered section (10 in Fig. 1 of Singh) having a linear cross-section and defining an angle (In its most broad interpretation, having a linear cross-section does not overcome that from Singh as 10 in Fig. 1 of Singh possesses a linear cross-section defining an angle) between about 70° and about 110 (line 55 in part II of the specification, as well as that from Claim 3, and visually from the bottom of Fig. 1), said cavity further defining and upper end defining a concave surface (12 in Fig. 1).

As for Claim 20, Re: Claim 19, Singh discloses a self-piercing fastener wherein the concave surface defines an interior angle of about 160° (Concave angle at the top of the hollow cavity (8) in Fig. 1).

As for Claim 21, Re: Claim 19, Singh makes known a self-piercing fastener wherein the shank has an outer diameter (3 in Fig. 1 of Singh) and a substantially flat ring-shaped end surface (ends of d2 in Fig. 1) adjacent the conical tapered section (10 in Fig. 1) the flat ring-shaped end surface having a radial length defined substantially perpendicular to the shank outer diameter, (The radial length of d2 in Fig. 1 **can in its most broad interpretation** be considered substantially perpendicular to the shank outer diameter, as the ends of d2 can be considered perpendicular to 3 in Fig. 1. The term substantially can and is considered an extremely broad term for claim language).

As for Claim 22, Re: Claim 19, Singh shows a self-piercing fastener wherein the shank defines a thickness between shank outer surface and a shank inner surface, the thickness being between about 20% to about 45% of an outer diameter of the shank outer surface ($(d2-d1)/2$ = a thickness between shank outer surface and a shank inner surface (6 from Fig. 1).

Claim Rejections - 35 USC § 103

[5] The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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[6] Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Singh U.S. Patent US 2001/0006321 A1 in view of (NPL, eFunda.com, see enclosed print out).

Singh teaches of the above claims as discussed earlier in this detailed action.

However, Singh fails to disclose expressly the necessity to heat treat the entire rivet to prevent stress corrosion.

efunda.com teaches that heat treatment is often associated with increasing the strength of material, but it can also be used to alter certain manufacturability objectives such as improve machining, improve formability, restore ductility after a cold working operation. Thus it is a very enabling manufacturing process that can not only help other manufacturing process, but can also improve product performance by increasing strength or other desirable characteristics, such as preventing stress corrosion.

At the time of invention, it would have been obvious to one of ordinary skill in the art to modify the self-penetrating fastening system taught by Singh, to a heat treatment taught by eFunda, in order to help deter possible stress corrosion to the rivet.

[7] Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Singh U.S. Patent 6,385,843 in view of (NPL, arrowfastener.com-see enclosed print out).

Singh teaches of the above claims as discussed earlier in this detailed action.

However, Singh fails to disclose expressly the specific type of materials that the rivet can be made of.

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Arrowfastener.com teaches that some variations in compositions in rivets include those in steel, stainless steel, and aluminum. Continuing, steel rivets are pertinent for heavy duty jobs and when riveting steel to steel. Aluminum rivets are extremely useful for lighter weight jobs and materials such as aluminum, fabrics, plastics, etc.

At the time of invention, it would have been obvious to one of ordinary skill in the art to modify the rivet as taught by Singh, to an array of diverse materials for the composition of rivets as taught by arrowfastener.com, in order to maximize the fastening stronghold by choosing the appropriate material composition of the rivet for the specific metal the rivet is penetrating.

[8] Claim 12 is rejected under 35 U.S.C 103(a) as being unpatentable over Singh U.S. Patent 6,385,843 in view of (NPL, eFunda.com, see enclosed print out).

Singh teaches of the above claims as discussed earlier in this detailed action.

However, Singh fails to disclose expressly the rationale and usage of reducing the temperature of the fastener to less than -100 degrees C.

eFunda.com teaches the importance of heat treatment, and how cooling can alter the physical and mechanical properties of a metal without changing the products shape.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the rivet as taught by Singh, by subjecting the former to a cooling/freezing process that would allow a precise fit for the rivet into a discreet hole and also allowing the rivet to initially travel further into the materials. Also, as the temperature of the rivet increases once again, the metal will expand, creating a greater connection/bond between the rivet and the other materials to which it is being fastened.

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[9] Claim 23 is rejected under 35 U.S.C 103(a) as being unpatentable over Singh U.S. Patent 6,385,843 in view of Korb et al. U.S. Patent 5,414,922.

Singh teaches of the above claims as discussed earlier in this detailed action.

However, Singh fails to disclose expressly the specific type of materials that the rivet can be composed of.

Korb et al., teaches of forming a pivot with an iron-based alloy to take advantage of the outstanding mechanical properties of the metal.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the rivet as taught by Singh, by subjecting the former to a iron-based creation to utilize the mechanical properties of the metal, and offer an alternative to the aluminum based alloys, specifically those with the purpose of inserting the pivot into steel rather than aluminum.

Allowable Subject Matter

[10] The amendment from Claim 14 is considered proper and thus, 14, 15, 17, and 18 are in terms for allowance.

Claims 3 and 6, objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

[11] Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.


[12] Any inquiry concerning this communication or earlier communications from the examiner should be directed to David C. Reese whose telephone number is 703-305-4805. The examiner can normally be reached on 7:30 am - 5:00 pm M-Th, and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, J.J. Swann can be reached on (703) 306-4115. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sincerely,
David Reese
Examiner
Art Unit 3677



ROBERT J. SANDY
PRIMARY EXAMINER